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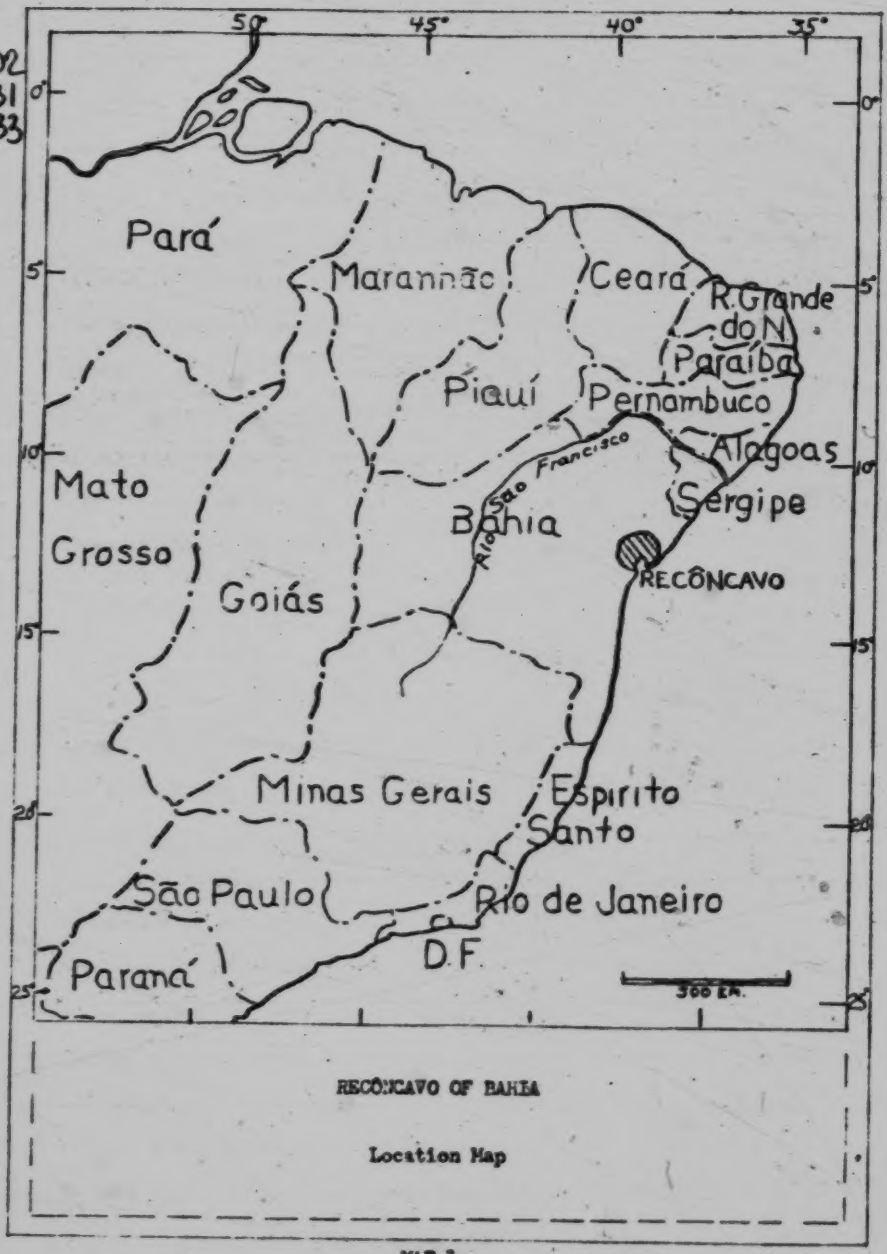

MAP 1

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

• 133 Landforms. Flat surfaces are a characteristic feature of the landscape of the Recôncavo. Where these flat surfaces are low and undivided, they form the plains of the coast and the central Recôncavo. Where they are higher and separated by valleys into relatively extensive tabular segments, they form the uplands of the north and west of the region. Where the flat surfaces are dissected into numerous small tabular or rounded segments, they form the belt of intermediate hills. The slopes separating the hills and the uplands have different forms. Some tabular surfaces are separated by steep and rugged slopes, occasionally leading to flat valley floors. In other cases rounded slopes are common. The accompanying map of east-central Bahia delineates four zones in each of which a distinctive association of these various forms is characteristic.[1]

The Tabular Uplands. The Tabular Uplands have a landscape of considerable simplicity. They have been formed upon a surface of relatively flat-lying sedimentary rock, generally Tertiary sandstone, although sometimes Cretaceous shale has been exposed in the valleys.[2] The surface has been subdivided by stream erosion into tabular segments called taboleiros. Many of these taboleiros are very extensive: one continuous taboleiro on the northern border of the Recôncavo covers a large part of northern Irará, southern Inhambupe, and eastern Serrinha. They are essentially plain surfaces with a local relief on the order of ten meters or less. At the edges these tablelands break away sharply into very rough zones, often of badland topography. The larger valleys are cut one hundred meters or so below the upland surface. Minor valleys are generally narrow, but the major streams have cut laterally so that they have produced relatively flat-bottomed valleys up to two [134] or three kilometers wide. The taboleiro surface is commonly mantled

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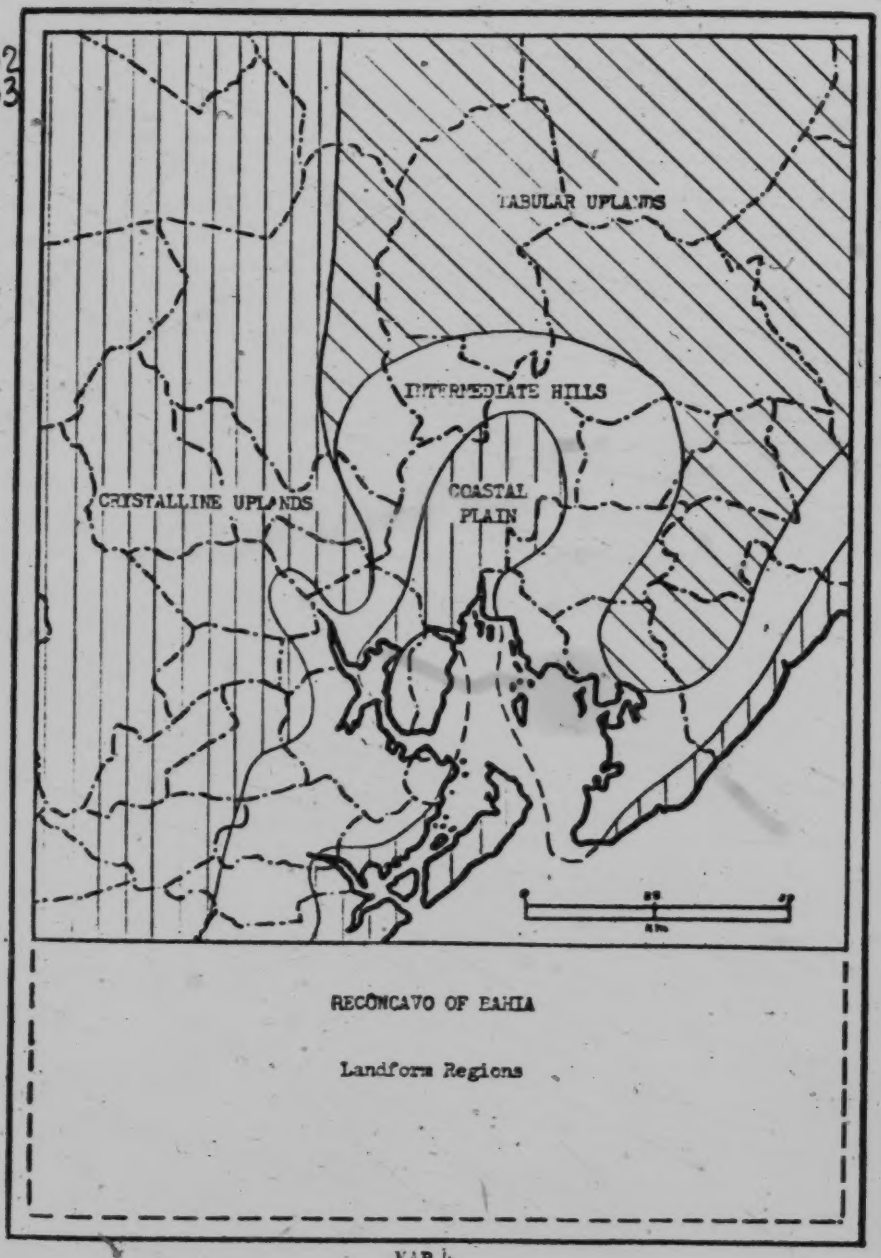

MAP 4

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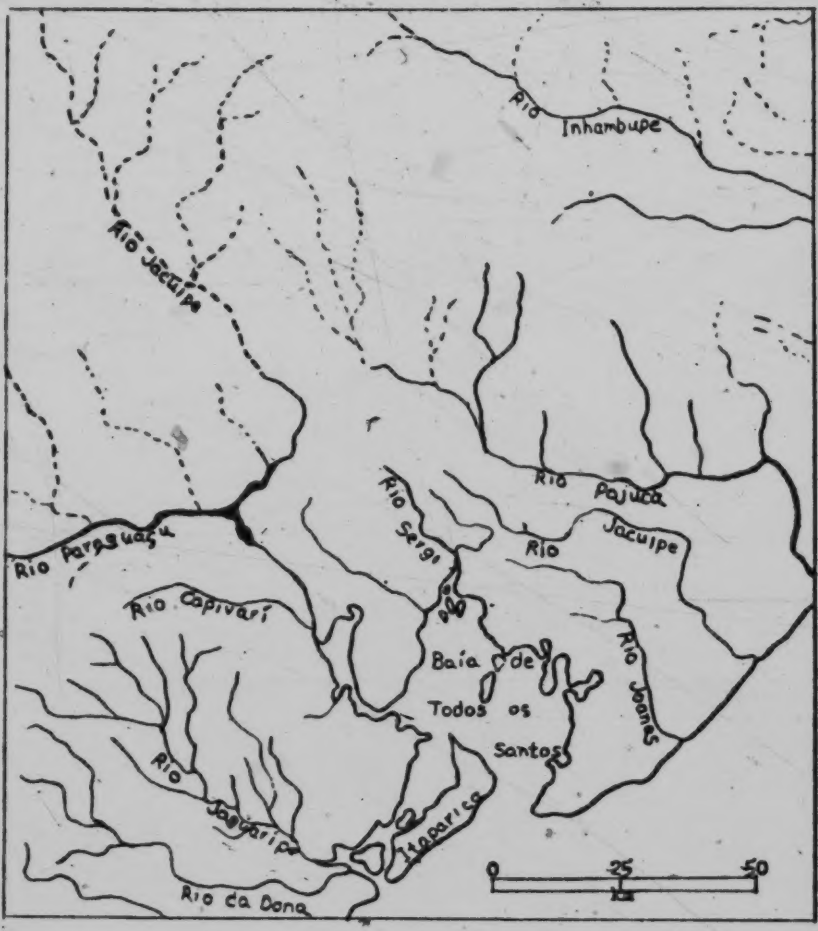

RECÔNCAVO OF BAHIA

Important Physical Features

MAP 5

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133 in a layer of porous sand, and surface drainage is not well developed.
134 The valley floors are often choked with loose sand brought down from the upland, which is re-sorted and shifted by the rising streams in the wet season.

133 The southern part of the Tabular Upland zone, which borders the Recôncavo, is drained by two major river systems which flow directly eastward to the open ocean. The Rio Inhambupe rises in the midst of the vast tabuleiros of Serrinha, Inhambupe, and Irará and skirts the northern boundary of the Recôncavo. The southern edge of the Tabular Upland zone, lying within the Recôncavo, is drained by tributaries of the Rio Pojuca, which flow southward to join the main stream in its eastward course to the ocean.

The Crystalline Uplands. Tabular surfaces of a different order are characteristic of the crystalline zone which stretches from the western margin of the Bay westward to the Chapada Diamantina. These surfaces have been formed upon a relatively flat platform of crystalline rock--the so-called crystalline peneplain of Eastern and Northeastern Brazil. In this part of Bahia, however, the rock surface usually is buried deeply under a layer of residual mantle and appears only on valley walls and bottoms. The mantle has been dissected into tabular segments which are generally smaller than those of the Tabular Uplands. The valley formation is more distinctive: after an abrupt break the slopes form a continuous curve so that the valley bottoms are relatively more narrow and are gently sloping. Rising above the general upland level are occasional monadnocks with rounded, often rocky, surfaces.

So similar are the upper surfaces of the crystalline zone to those of the Tabular Uplands that the individual surfaces occasionally

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133 [134] are called taboleiros. This similarity is enhanced by the occasional appearance of sandy surface materials. However, the taboleiros of the Tabular Uplands are generally extensive; the individual uplands of the crystalline zone are generally of limited area. Valleys are an exceptional and areally limited part of the Tabular Uplands; in the crystalline, the valleys occupy a very significant part of the land, although collectively the area in tabular surfaces exceeds that in valleys.

The upland surfaces of the crystalline, like the Tabular Uplands, lack surface drainage. Where the upland surface is extensive, shallow circular depressions are often encountered. Some of these form large, shallow lakes or swamps overlying impervious clay layers. Equally characteristic is a small circular depression, ten to fifty meters in diameter, with a pit in the center through which water drains into the porous subsoil.[3] Neither of these depression forms was observed outside the crystalline zone.

Swamps and ponds are also found in the valley bottoms. Very often a resistant section of bedrock forms a constriction in the valley walls, and when this constriction becomes choked, streams are partially dammed. The streams themselves almost invariably originate in springs at the bottom of steeply sloping valley walls. A very characteristic site for these springs is in the very regular ampitheater-like bowls at the valley heads.

Almost all of the Crystalline Uplands of the Recôncave are drained by a single river system—the Paraguaçu. The main stream and its major tributaries rise in the Chapada Diamantina and the Serra da Sincorá far to the west in central Bahia. By the time it has reached the Recôncave, the Paraguaçu is deeply entrenched in the upland. It

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133 drains only a narrow belt along each side by means of short, precipitous, and intermittent streams. Its main northern tributary, the Rio Jacuípe, which is less deeply entrenched, drains the northern half of the Crystalline Uplands within the Recôncavo. The Rio Capivarí, which joins the estuary of the Paraguaçu, drains part of the southern half. The extreme southern part is drained by south-flowing tributaries of the Rio Jaguaripe, which reaches the ocean at the southernmost extreme of the Bay.

The Intermediate Hills. The coastal margins of both the Tabular and the Crystalline Uplands have general elevations of about 150 meters. The drop from this elevation to the coastal plain takes the form of a rough and deeply-dissected hill land, here called the Intermediate Hills. Tabular forms are still important in this area, especially along the interior boundary. However, these hills are differentiated from the uplands because of the relatively large amount of the total area which is in slope.

In those areas where the hills are cut in crystalline rock--along the edge of the Crystalline Uplands and along the coast north of Salvador--rounded, narrow-valley profiles are common. In the part of the hill land south of the Paraguaçu the transition from upland to seashore is very rapid, and the hills are particularly rough. North of the Paraguaçu and along the north coast the hills are less rugged.

In the northern Recôncavo, where the hills are cut in sedimentary material, the slopes are straight and steep, the valleys extremely narrow, and the whole complex minutely dissected. The sequence of hill forms from the uplands to the plains have the following characteristic stages: (1) in the upland the valleys cut deeper and the flat surfaces become smaller and smaller, (2) the valleys become very deep

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 (100 meters), and all flat upper surfaces disappear; (3) the height and circumference of the hills decrease and the valley floors widen; and finally (4) the plains dominate the surface.

The Intermediate Hills continue both north and south of the Recôncavo. In the south they become progressively rougher as they approach the low serras which here lie near to the coast. To the north, beyond the Recôncavo, the hills have relatively gentle slopes.

The Coastal Plain. Along the ocean both north and south of the Recôncavo the Coastal Plain is narrow. This plain enters the Recôncavo through the Bay (Baía de Todos os Santos) and forms a pocket of low-lying, relatively flat land which is the heart, geographically and historically, of the region. Most of surface of this zone is an undulant plain with an almost complete lack of steep slopes, but there are exceptions. In terms of the amount of land in steep slope and of elevation, the plain falls naturally into two sections. The part of the Coastal Plain which directly borders the ocean, including the islands of the Bay, lies very close to sea level. In the interior of the island of Itaparica and the smaller islands there are occasional steep slopes, but these are formed either on small hills or low sea cliffs.

The section of the Coastal Plain north of the Bay lies at an elevation of from 75 to 125 meters. Its surface is very gently undulating, and there are no steep slopes except for scattered and isolated hills near the interior margins and for the rough zone separating the slightly elevated plain from the Bay. Only around the cidade of Santo Amaro is there an appreciable plains area at near sea level. Much the same alignment of landforms is found in the smaller compartment of the Coastal Plain at the head of the Bacia do Iguape in the município of Cachoeira.

1-Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

133 The parts of the Coastal Plain along the ocean and above the Bacia do Iguape are drained by local streams. In the more extensive plain north of the Bay there are a number of larger and more significant rivers and streams. The northern part of the latter area is drained by the Rio Pojuca, the middle part by the Rios Jacuípe and Joanes, and the southern part by the Rios Traripe and Sergi. The Traripe and Sergi enter the Bay, but the other, larger streams drain eastward to the ocean. Except where the Traripe and the Sergi cross the rough edge of the plain, all the stream valleys are relatively shallow.

The Bay. There remains a last section to deal with—a very significant part of the Recôncavo, but not properly a "landform" area. This is the Baía de Todos os Santos. The Bay may be viewed as a central parallelogram which contains within it the deep water and which has a number of shallow, jointed channels extended from the corners. Beyond these channels, estuaries extend the Bay inland in three directions. Structurally the Bay is a part of the rift valley, but its present outline corresponds to the major fault scarp in only one place—in Salvador. Here the scarp separates the upper and lower
[134] sections of the city. Elsewhere the form of the Bay is determined by erosion of, and to a lesser extent, deposition upon the folded and faulted sedimentary deposits accumulated within the rift. These processes have produced a northern coast of bluff-enclosed bays and steep-sided archipelagoes, a western coast which is relatively straight and which rises to a higher elevation above the Baía de Todos os Santos, and on the south, the island of Itaparica, which stands like a door half-closed across the entrance to the Bay.

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487 The three most significant channels enter the western Bay from north, west, and south. Of these the Rio Sergi, on the north, is navigable for the shortest distance--this estuary is navigable by river launch only to Conde, which is the approximate limit of salt water, but sailing boats penetrate to the cidade of Santo Amaro.

The lower Paraguaçu provides entrance westward deep into the Intermediate Hills and to the edge of the Crystalline Uplands and opens a route to a smaller bay--the Bacia do Iguape. Motor vessels can reach São Roque, Maragogipe, and Cachoeira-São Félix through this deeply incised channel.

The southern channel, broader but more shallow, passes between the island of Itaparica and the mainland and entering the estuary of the Jaguaripe extends as far as Nazaré, which is the head of navigation of the southern area peripheral to the Recôncavo.

The Bay is the central area of the southern Recôncavo. Two of the channels, the Paraguaçu and the Sergi, link parts of the Recôncavo with the Bay. The third, which leads to Nazaré, primarily connects the Bay with an area outside the Recôncavo.

133 Land - Summary. In the Recôncavo there is much flat land in the uplands, but the area in plains is relatively limited. In the uplands, and to a lesser extent in the hills and along the margins of the plains, the flat surface is subdivided into individual segments.

The largest single segment of relatively flat land in the Recôncavo is the coastal plains area north of the Bay. The other plains areas--the island of Itaparica and the small compartment north of the Bacia do Iguape--are smaller flat-surfaced segments. After these, the largest continuous flat surfaces are the extensive tabuleiros of the Tabular Uplands. Smaller tabular surfaces are

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133 characteristic of the Crystalline Uplands; while in the hill zone the individual flat surfaces are very small.

Local relief is usually greatest in the uplands, near the major rivers, such as the Paraguaçu, Jacuípe, and the Inhambupe, and where these rivers cross the hill belts. On the plains the local relief is usually about fifty meters, but north of the Bay about twenty-five meters.

Soils

134 Introduction. Fertile soils are not extensive in the northeast of Brazil. In this respect it is typical of the tropics, where only singularly propitious base materials or exceptional genetic processes have succeeded in producing soils of high natural fertility. As a result of the prevailing infertility, the limited fertile areas have an extraordinary importance.

Bondar testifies to the general infertility of the soils of Bahia and thus indirectly to the significance of the areas of good soils

> The modest percentage of the soil which is cultivated, in relation to the expanse of territory, does not allow us to conclude that it is still too early to worry ourselves with the conservation of agricultural soils. Arable land is scarce in Bahia. There are great expanses of territory which are not suitable for the cultivation of annuals.[3]

Perhaps the lack of interest in soil conservation in the Recôncavo is a result of the almost mystical faith in the unending richness of the massapê--the Cretaceous soils of the sugar cane zone.

The Recôncavo as a whole is an area of only moderately fertile soil. There are many zones of extreme infertility. The soils of the Recôncavo generally have been divided into three general types, and as will be seen, tend to have a distinctive pattern of land use.

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134 suggests a better English equivalent:

> North of the Bay of Todos os Santos lies an undulating region some sixty miles long by thirty wide. The soil of this region is a cretaceous marl, exposed by the tertiary overburden having been eroded away. The deposit is of great thickness and may be compared with the black gumbo Belt of Southern Arkansas and Northern Texas.[11]

The fertility of the massapê is established by both chemical analysis[12] and the history of agriculture in the Cretaceous zone. For four centuries these soils have supported a system of intensive sugar cane cultivation, presumably without severe decline in yield. Soil fertilization was practically unknown until the last half-century and is still uncommon.

134 An element in the local mythology of the massapê is that it is 133 completely resistant to erosion; and indeed there seems to be little erosion in most areas of massapê soil. However, the southern edge of the massapê zone, drained by the Rios Traripe and Sergi, is deeply and severely gullied. In the north the downcutting of the Rios Jacuípe and Joanes apparently has been limited by the resistant barrier of crystalline rocks through which the rivers pass in their seaward course.[13] The low gradients of these streams may have restricted stream bed erosion and reduced the erosion of the interfluves.

134 Sandy Soils of the Tertiary Taboleiros. While the Tertiary deposits and the soils derived from them have been removed almost entirely from the mainland areas close to the Bay, they still cover most of the land surface farther north. Most of the Tertiary soils are derived from fine-grained and weakly-cemented sandstones. The sandy soils are variable in depth, but very thick soils are not uncommon. Because of their porosity, these sands are extremely vulnerable to drought. They are easily eroded and especially subject to gullying. Their fertility, especially in situ, usually is very low.

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134 The taboleiro (upland) soils of this type are in some areas almost sterile, completely unsuited to cultivation. Even the best of the upland Tertiary soils is relatively unproductive. Whether the [132] soils are deep or shallow, the crops grown upon them suffer severely from desiccation during the dry season and during the perennial droughts characteristic of the northeastern interior. The porous [133] character of these sands has restricted the development of surface streams and of erosion in the centers of the taboleiros. On the edges the exposed slopes of the taboleiros have been gullied deeply.

Two contrasting soil types are found in the valleys. Sands carried from the uplands have mixed with fresh materials and with small quantities of humus and have produced more fertile sandy soils. These alluvial soils are much more intensively used than those of the taboleiros, but cultivation is hazardous because of frequent flooding. Where the main streams--such as the Rio Inhambupe--have cut deeply they have exposed the underlying Cretaceous series. In these deeper valleys the soils are very similar to those of the larger Cretaceous zone to the south.

The boundary between the zones of Tertiary and Cretaceous soils is broad and irregular. The surfaces of the interfluves are covered with Tertiary sands; the deeper valleys have Cretaceous clays. The wide boundary zone has never been mapped in any detail; therefore the location of the common border on the map of this study can be drawn only approximately. A few Tertiary sands are found in the crystalline zone to the west--these will be discussed below.

Soils of the Crystalline Zone. The geologic and topographic maps which are available for the Recôncavo are a useful guide to the distribution of soils derived from sedimentary deposits. However, in

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134 The soils of the peninsula northeast of the city of Salvador are
[245] chiefly crystalline-derived. Near the sea and extending inland five or ten kilometers is a belt of white sand dunes, which are not cultivated but are planted in coconut palms. Bondar reports some fertile diorite-derived soils in the peninsula above Salvador, but does not precisely locate the area.[16] Observations in Salvador and its environs suggest that at least two soils of the Western Recôncavo, the crystalline massapê and the slope-land clays and clay-loams, are characteristic also of the peninsular area.

Alluvial Soils. The areas of alluvium in the Recôncavo are so
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• 133 limited that it might almost be said that there are no alluvial soils. There are no conspicuous deltas. Along the margin of the Bay and the estuaries which feed into it there is usually a precipitous decline from the plains or hills to the narrow beach. Narrow lowlands with alluvial soil were observed in three areas: (1) on the west coast of the island of Itaparica and on the mainland opposite; (2) on the north side of the Bay between the Rio Sergi and the island of Madre de Deus;[17] and (3) along the estuary of the Rio Paraguaçu between the cidade of Maragogipe and the head of the Bacia do Iguape. These marginal alluvial lowlands cover only a very limited area of the total Recôncavo. Most of the alluvial lands are mangrove swamps or very low-lying semi-swampy
[241] plains. No cultivation was observed in any of these alluvial areas.

Most of the valleys of the Recôncavo are so narrow that except in the major valleys of the Tabular Uplands, river bottom alluvium is rare.

Soils - Conclusion. The soils pattern which has been developed above is closely related to the patterns of parent material and topography. These correlations are in part a reflection of strong functional relationships between material, terrain, and soil in the Recôncavo. These

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133 correlations are in part only apparent: they result from using geologic and topographic categories to map and classify soils.

13 Both climate and vegetation are also important factors in soil formation. Since the Recôncavo is a zone of sharp transitions in climate and vegetation, it is to be expected that these variations would be reflected in the soil pattern. In the Recôncavo, however, patterns of climate and vegetation generally re-enforce the patterns of material and terrain as they affect soils. The Cretaceous coastal lowlands are the most humid part of the Recôncavo. The inland Tabular and Crystalline Uplands, which is to say the Tertiary and crystalline soil zones, are markedly drier, as will be seen below. Thus the boundary between the Cretaceous and non-Cretaceous soils approximates a climatic transition, a transition which is also the forest and scrub-forest boundary.

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241 The soils of the Recôncavo have been used for agricultural purposes for a long time--for about 400 years in the Cretaceous zone. They have been used with varying intensity: in the Cretaceous zone under an intensive monoculture, in the other soils zones under less intensive systems of field and fallow or as wild pasture. The affects of this prolonged use, with little soil conservation, can be only inferred. In the Cretaceous zone there is much complaint of low sugar cane yields, and a few cultivators are turning to commercial fertilizer. It is not clear whether these complaints and remedies result from a marked deterioration of the soil or from the declining competitive position of the sugar industry of the Recôncavo. In the crystalline zone it seems likely that only in the last few decades has cultivation become sufficiently intensive to cause--through shortening the fallow period--the deterioration of the soils. This affect is now beginning to be noticeable in the relatively intensively cultivated lands near the Rio Paraguaçu.

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132 station has an annual range of more than 7° C. The average daily minimum for the brief record of Cruz das Almas is 19° C.--the average maximum, 28° C. The absolute minimum recorded temperature was 13° C, while the absolute maximum was 37° C. These data for Cruz das Almas are probably typical of the interior section of the Recôncavo. More narrow ranges between maximum and minimum temperatures are characteristic of the coast. The mean deviation for the region--since Cruz das Almas is probably representative of the most variable situation--is less than 5° C. From the foregoing it is apparent that winter and summer have little meaning in the Recôncavo in terms of absolute temperatures.

Sensible temperatures are more variable, for they depend upon humidity, sunlight, and winds as well as upon absolute temperature. In the interior, outdoor activity is reduced during the cooler wet season and also during mid-day in the hot dry season. Wind exposure becomes very important, and those locations where the even flow of the trades is uninterrupted are preferred for dwellings, especially in Salvador. On the other hand, humid coastal areas which are cut off from the trades--such as the "lower city" of Salvador--often are very oppressive.

132 133 Annual Precipitation. The uneven seasonal and areal distribution of rainfall in the Recôncavo contrasts with the relatively uniform distribution of temperatures. With insignificant exceptions, any traverse from the coast to the interior passes from a humid to a less humid zone. Thus the outline of the coast, including the indentation of the Bay, is generally reflected in the distribution of precipitation. In addition, the coast north of the Recôncavo is distinctly less humid than the mountain-backed southern coast, and this general transition also is reflected in the rainfall pattern of the Recôncavo, as may be seen on the map of mean annual precipitation.

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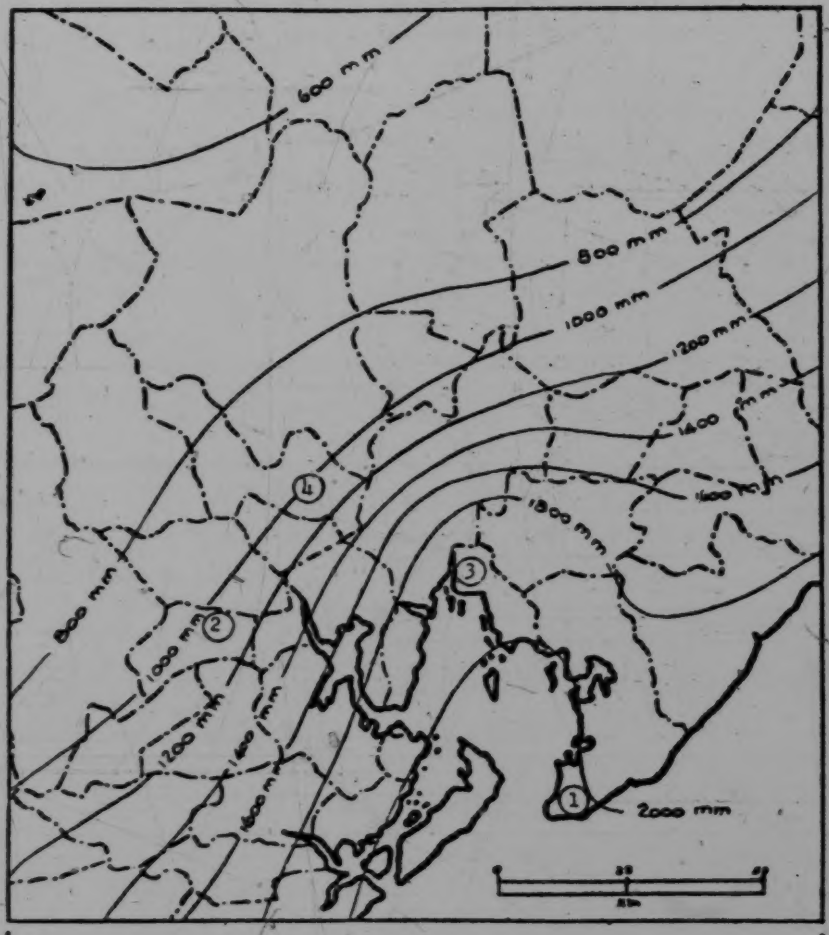

RECONCAVO OF BAHIA

Mean Annual Precipitation

Meteorological Stations:
1 - Salvador. 2 - Cruz das Almas. 3 - São Bento das Lajes. 4 - São Gonçalo.

MAP 7

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

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133 Most of the lowland margins of the Bay have an estimated precipitation of from 1800 to 2000 mm. It may be inferred that the steep slopes rising from the ocean and the Bay have somewhat more rainfall and that some of the sheltered areas, such as the head of the Bacia do Iguape, have less. These inferred differences in rainfall do not seem to be great enough to have produced detectable contrasts in the natural vegetation or in cultivation practices.

The northwestern sector of the Recôncavo[22] is significantly drier, with less than half as much annual precipitation as the Bay littoral. The rainfall of this dry sector is estimated roughly—there are no weather stations in this area—at 600 to 800 mm. Orographic factors probably do not affect significantly the general rainfall pattern in this zone of tabular hills, but the windward slopes and eastern bases of the monadnocks seem appreciably more humid.[23]

The humid littoral and the sub-humid northwest of the Recôncavo are separated by a very steep gradient zone. Weather data from two stations within this zone, one at the northernmost point of the Bay and the other 21 miles westward, indicate a decline of 48 per cent in annual precipitation.[24] Although the isohyets on the map of annual rainfall are more or less evenly spaced over the transition zone, it is likely that the decline in precipitation is very rapid along the Intermediate Hill zone. The eastern intermediate hills are in moderately heavy coastal forest, but the western hills, like the uplands beyond, are in scrub-forest—presumably these differences reflect a rapid decline in precipitation.

In general, then, the Coastal Plain of the Recôncavo has from 1800 to 2000 mm. of annual rainfall. The Tabular Uplands and the northern Crystalline Uplands have less than 1000 mm. The Crystalline Uplands south of the Rio Paraguaçu have about 1200 to 1400 mm.

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every section of which is more than 50 kilometers from Salvador, the economic center of the Recôncavo, and also more than 50 kilometers from the geometric center in Santo Amaro. If a line were drawn from the cidade of Alagoinhas southwestward to the cidade of Nazaré, the following municípios would fall entirely west of that line: Irará, Coração de Maria, Feira de Santana, São Gonçalo, Conceição da Feira, and Santo Estêvão--all north of the Rio Paraguaçu--and Muritiba, Cruz das Almas, São Félix, São Filipe, and Conceição do Almeida--all south of the Rio Paraguaçu. These 11 of the 21 municípios of the Recôncavo are all more than 50 kilometers from Salvador--all are much farther in terms of land transport. In these eleven municípios live 125,000 of the 196,000 agricultural workers. In part, this eccentricity with respect to Salvador is a result of the shape of the land surface, with the city located at the end of a peninsula. Only one of these 11 municípios, São Félix, lies on tide water, and that at the extreme upper limit of navigation. The others are so arranged that they cannot make optimum use of the central position of the Bay, with its relatively cheap and direct route into the capital.

This eccentrically located belt is arcuate in form. It is the demographic representation of the transition zone from forest to scrub forest, which is often also the transition from the Coastal Plain to the Tabular or Crystalline Uplands. The concentration of agricultural labor in this belt is obviously significant from many points of view: social and political as well as economic.

Clustering is a characteristic pattern of Latin American population. The Recôncavo is the chief population cluster and the greatest single concentration of agricultural labor force within the state of

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161 162 241 464 361 else along the western border. This modest concentration, scarcely a cluster, represents the sum of a number of small agricultural settlements scattered along the humid slopes of low serras. There are about 12,000 agricultural workers distributed over this area.

161 162 131 241 464 The distributional pattern of the rest of the Recôncavo can be visualized as a coarse net in which the clusters are linked by areas with population densities of 10 to 20 per square kilometer. There is one large hole in this connecting net: along the common border of Cachoeira, São Gonçalo, and Santo Amaro there is a zone with less than ten and sometimes less than five agricultural workers per square kilometer. This zone, very near to the center of the Recôncavo, for 133 the most part is an area of rough sandy hills bordering the crystalline--here the hills are particularly rugged and the transition zone broad. On three sides--southwest, north, and northeast--this sparsely settled zone is bordered by important clusters of agriculturalists.

161 162 241 464 The agricultural labor force of the Recôncavo is, as has been seen, irregularly distributed. This distribution is highly fluid--movement and growth and decline are continuously altering the pattern. The whole region gained about 6,500 agriculturalists between 1940 and 1950, but these statistics do not reflect the extent of local relocation.

161 162 241 464 634 In the central Recôncavo one município, Santo Amaro, lost almost 6,000 agricultural workers between 1940 and 1950, and in three municípios of the central and eastern Recôncavo, Santo Amaro, São Francisco, and Pojuca, losses exceeded 20 per cent. On the other hand, in three municípios of the uplands of the northern and northwestern Recôncavo--Alagoinhas, Feira de Santana, and Santo Estêvão--there were gains of over 20 per cent. Over all, twelve municípios gained and nine lost agriculturalists; the mean change in the agricultural labor

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[31]However, almost all areas of Brazil have perennial labor shortages.

[32]In 1950, the urban centers in Brazil with more than 250,000 population were:

Rio de Janeiro	2,303,063
São Paulo	2,017,025
Recife	512,370
Salvador	389,422
Porto Alegre	375,049
Belo Horizonte	338,585

[33]Others are Campina Grande in Paraíba, Sorocaba in São Paulo, and Tres Corações and Campo Belo in Minas Gerais.

[34]Cachoeira and São Félix are twin urban developments opposite each other on the Rio Paraguaçu. The river here is narrow, and the two centers are linked effectively by a combined railroad-highway bridge. In 1950 the population of Cachoeira was 10,825; the population of São Félix, 5,872. The two cidades are, in the main, a single functional unit.

[35]Santo Amaro proper can be reached by sailing craft or canoes only, but small steamers of the type used in the Bay regularly ascend the Rio Sergi to the outskirts—the connection into the city proper is by a streetcar drawn by two recalcitrant mules.

[36]There is little direct evidence for this conclusion, but it is a reasonable inference from the present flow of goods and the observable decline in wealth and prestige in these cities. Nowadays the steamers which serve these ports carry passengers almost exclusively, and the number of sailing craft (saveiros) loading is generally small. It should be noted that trucks play a much more important role in the movement of goods than the railroads, except in the sugar zone, and that busses rival railroads as passenger carriers. The main highway system of Bahia has by-passed both Santo Amaro and Cachoeira.

[37]An all-weather road is now being constructed from Conceição do Almeida to Maragogipe. This will enable passengers and goods moving toward Salvador via the Bay to by-pass Cachoeira-São Félix. This may well further reduce the importance of the latter and increase the growing prosperity of Maragogipe.

[38]Muritiba is only 5 kilometers from São Félix, but the two cities are quite distinct. São Félix-Cachoeira occupies the lower slopes of the narrow valley of the Rio Paraguaçu. A belt, composed of the upper slopes and the edge of the Uplands, which is all either cultivated or in second growth, makes a distinct but narrow, 3 kilometers wide, break between Muritiba and São Félix.

[39]Nazaré is the main shop and Santo Antônio an important station of the Estrada de Ferro Nazaré. The terminus of the "Nazaré" is São Roque do Paraguaçu—down river from Maragogipe. Castro Alves is on the Brumado, Caculé, and Rio de Janeiro branch of the "Léste," and Serrinha is on the Alagoinhas, Bonfim, Juàzeiro branch of the same line.

[40]Estimated from 1940 occupational data.

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11
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CHAPTER V

CROPS AND CROPLAND DISTRIBUTION

BB 241 133

Introduction. The Recôncavo is an enclave of cultivated land facing on the sea and more than half surrounded by the Sertão of Northeastern Brazil. It is one of a number of detached areas of dense settlement and intensive crop cultivation scattered along the northeastern coast--Pernambuco, Sergipe, Alagoas, and the states of the northern coast of the "bulge" of Brazil have similar coastal nuclei. Indeed, this littoral mode of settlement is characteristic of Brazil, although in the center and the south of the country the concentrations of settlement and cultivation are usually separated from the ocean by a belt of rough hills or mountains. A glance at a population map clearly reveals that Brazil is a coastal nation as far as the distribution of its people is concerned; indirectly such a map demonstrates the coastal distribution of crop cultivation. In this, Brazil somewhat resembles the United States at the opening of the nineteenth century when it, too, was altogether a nation of the Atlantic seaboard. The specific nuclear character of the Recôncavo dates from the beginning of its settlement--it was from the first a region of crop cultivation, and the settlement of the sertão of Bahia derived from the people and needs of the Recôncavo. During the four centuries since the Portuguese first came, the crops, animals, and systems of production of the Recôncavo have retained much of their original character.

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The present chapter deals with the principal activity of the Recôncavo, the production of crops. As a preliminary to the discussion of the individual crops and their distributions, it is appropriate to

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B 249 433 Sugar cane is the fifth or sixth--depending upon the year--most valuable crop grown in Brazil, and it is cultivated, at least on a small scale, in all states of the country. Large scale commercial production, however, is confined to two areas--the Central-South (São Paulo, Rio de Janeiro, and Minas Gerais) and the Northeast (Paraíba, Pernambuco, Alagoas, and Bahia). Each of these states produced over one million tons of cane in 1948.

B BB 249 175 179 In distinction to the principal subsistence crops of the Recôncavo, sugar cane is an old world domesticate. The variety acquired by the Portuguese from the Arabs in North Africa and brought to the colony via the Madeira Islands was the sole type cultivated during most of the colonial period, but today a number of varieties of East or West Indian origin are grown.

BB 249 Sugar cane is differentiated from other crops of the Recôncavo by the intensive monocultural character of its production. Tobacco and manioc and corn and beans are grown jointly, but sugar cane shares the land with no other crop. North of the cidade of Santo Amaro there is BB [134] [133] an extensive area of clay soils and undulating plain almost completely blanketed in bright green sugar cane. The monochrome is interrupted only by a few pastured valley bottoms or by the widely scattered usinas (sugar mills), plantation settlements, and villages. There are similar, though less extensive landscapes wherever sugar cane is important in other parts of the Recôncavo.

The system of cultivation of sugar cane is also very different from those employed in producing other crops in the Recôncavo. One planting is sufficient for several reasons, for the stalk re-develops from the root after the plant is harvested, though with progressively declining vigor. In Bahia, three, four, or five harvests from the

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

245 311 Within the Recôncavo coconut production is important along the sandy beach line of the island of Itaparica and along the ocean coast of Salvador, where coconuts are virtually the only agricultural product [133] [134] (Maps 58, 59, and 60). The inner shores of the Bay, which rise abruptly with rocky clay slopes, bear very few coconuts, except in a low-lying sandy zone along the estuary of the Paraguaçu. Coconuts are produced 245 [423] chiefly on large properties which are frequently owned by urban families. [464] The plantations are operated with hired labor drawn from the coastal [438] population. When harvested, the coconuts are sold in the urban markets [258] of Salvador and other cities and towns. Very little of the Recôncavo [439] production is converted into oil, and little is exported.

Oranges. The navel orange is a Bahian development, a mutation [433] of the orange brought from Europe. The main centers of Brazilian production, however, are elsewhere in the country, and cultivation of oranges within the Recôncavo is primarily for local consumption.

245 311 Scattered orange trees are a feature of the rural and urban landscape in many areas. In addition to this generalized cultivation, which frequently is not shown in the official data, there is commercial production in the environs of several urban centers—Alagoinhas, Santo Antônio, and to a lesser extent, Salvador (Maps 61 and 62). The [489] [443] cidades of Alagoinhas and Santo Antônio are both markets for part of the local crop; moreover, both are on the railroads leading to Salvador, which is the chief market for the entire region. In addition to these three main concentrations, there are numerous orange groves in the Southwestern Recôncavo which apparently serve both local and regional markets, though on a small scale. In general the relative area in orange groves is not great, yet in 1948 they occupied 10 per cent of the cropland of Alagoinhas.

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

Footnotes - Chapter V

000 [1]The outstanding example of the ribbon development of cropland is along the highway which traverses the Crystalline Uplands from Santo Antônio to Feira de Santana. Each of the cidades along this road—Conceição do Almeida, Cruz das Almas, Muritiba, São Félix, Cachoeira, Conceição da Feira, and São Gonçalo—is the center of an intensively cultivated zone and is connected with the others by a belt of cropland running along the highway. In part this ribbon development is the result [133] of restrictive factors; in Conceição da Feira and São Gonçalo the intensively cultivated strip runs between the rough Intermediate Hills on the [132] east and the dry caatinga on the west. The same negative relationships are characteristic of the Southwestern Recôncavo, but the intermediate zone of acceptable terrain and climate is here broader than in the north.

[2]Produção Agrícola: 1948.

[3]Ministério da Agricultura, Serviço de Estatística da Produção, "Pobulação Pecuária, Em 31/12/1948."

[4]For a map of manioc production in Latin America, see: Office of Foreign Agricultural Relations, Map of "Manioc Estimated Production Latin America," Agriculture in the Americas, Vol. III, Nos. 8-9 (August-September, 1947), p. 120.

[128] [5]A more detailed discussion of processing of farinha de mandioca is given in Chapter X.

[6]Ruth Matos Almeida Simões, "Comentário do Mapa da Produção de Mandioca no Estado da Bahia," Boletim Geográfico, Vol. XI, No. 112. (January-February, 1953) pp. 84-86.

[7]It is likely that the official figures underestimate the area and production of manioc. A considerable part of the crop is grown on small plots remote from political centers and well-traveled routes and may thus have escaped the enumerator. Moreover, its cultivation is so commonplace and its exchange often so local and in such small quantities that even tax-conscious local government officials may easily be unaware [127] of small and scattered plots which in sum may bulk fairly large. Some of the official data which have been used in the analysis of manioc cultivation, production, and value have been modified. For a discussion of these modifications and for maps based upon the unmodified data, see Appendix D.

[8]Conceição do Almeida, Cruz das Almas, and São Filipe.

[9]This popular and official view underestimates the importance of [128] manioc production in its own right. The commercial element in manioc production is discussed in Chapter IX.

[128] [10]The system of manioc cultivation will be discussed in conjunction with the tobacco-manioc system in Chapter VI.

[245] [11]The "coffee zone" of Bahia includes a number of municípios, from Laje (adjoining Santo Antônio) to Jequié along the Estrada de Ferro Nazaré

1:Haskins K-4,5 (1952-1954)1956 SO11 Bahia Brazilians SO11

APPENDIX B

Geologic Structure

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135 The Archaean granites, gneisses, schists, and metamorphics are the most common surface rocks in eastern Bahia, where they form part of the so-called crystalline peneplain of Northeast Brazil. The Baía de Todos os Santos and the sedimentary lowlands and uplands north of the Bay occupy a rift in the crystalline platform which extends northward beyond the borders of the state. This rift runs through the center of the Recôncavo and is occupied in the south by an arm of the sea and in the north by sedimentary rock. On each side are crystalline zones, extending far beyond the Recôncavo to the west, but limited on the east by the sea.

[134] In the rift zone the upland deposits primarily are Tertiary, but where erosion has cut deeply, as it has north of the Bay and in major valleys such as that of the Rio Inhambupe, the underlying Cretaceous material has been exposed.

In a few places on the crystalline platform, especially south of the Rio Paraguaçu, there are small remnants of the Tertiary sediments.

1. Sugar Country

THE REGION of Brazil in which this study was made is a small area in the state of Bahia called the Recôncavo. This is the land surrounding the Bay of All Saints, a fertile basin extending inland no more than 40 kilometers at the most. Situated on a high bluff overlooking the entrance to the Bay of All Saints is Salvador, the capital of the state of Bahia, generally referred to as Bahia, or "the capital," or simply "the city." After Salvador was settled in 1549, the colonization of the Recôncavo proceeded at a rapid rate. Since early in the colonial period, the Recôncavo has been divided into three distinct areas: a southern area devoted mainly to the raising of manioc, the food staple of much of Brazil; a western section devoted to the cultivation of tobacco; and a northern and eastern area, given almost exclusively to large-scale sugar-cane monoculture. This study was made in the third zone, the one producing sugar cane.

The region, which can be called the "sugar-Recôncavo," partakes of the long tradition of sugar-cane growing which formed the basis for the early colonization of Brazil. A narrow strip of land along the northeast coast of Brazil in what are now the states of Pernambuco, Sergipe, Alagoas, and Bahia was the focus of the economic, political, and social life of the entire colony. This region, under the colonization of the Portuguese, produced a large part of the world's sugar supply at a time when sugar was a great luxury in Europe. The northeast coast of Brazil became an exceedingly prosperous part of the colony early in its history. Salvador, in Bahia, and Recife, in Pernambuco, became the most impor-

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tant centers of colonial life, and until 1763 Salvador was the capital of the Portuguese colony.

The Recôncavo helped to make Brazil a unique part of the Portuguese empire in the sixteenth century. Brazil was different from any of the other Portuguese colonies, for its wealth proved to lie in agriculture rather than in trade, as was the case in India and Africa. The Bay of All Saints, with a circumference of 200 kilometers, is in effect an inland sea, the entrance to which can be guarded from the heights on which the city of Salvador is situated. There are a number of picturesque islands throughout the bay, with good beaches and landing facilities. Many small rivers empty into the bay, and numerous creeks navigable at high tide extend further inland along its shores. The presence of such a large network of navigable waters was an important factor in the rapid development of the Recôncavo, providing easy and inexpensive transportation of sugar to the point of shipment to Europe.

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The climate is semitropical, with two seasons. Summer, from September to sometime in March, is relatively dry, dotted by showers and thunderstorms and cooled by fresh breezes blowing in from the Atlantic. Winter begins in April, lasting until August or September, the exact time of change differing from year to year. This season is marked by continued rain, usually a soft, constantly falling drizzle or light rain, interspersed with heavy showers, as front after front moves in from the Atlantic, dropping its moisture before being pushed upward by the abruptly rising land which surrounds the Recôncavo. According to statistics for the years 1914 to 1938, the months of minimum rainfall are October, November, and December; during this time the average rainfall was 11.81 inches. The period of maximum rainfall is April, May, and June, with an average of 35.83 inches for the three-month period. The yearly average from 1914 to 1938 was 65.93 inches.[1] The temperature range is from 70 to 90 degrees Fahrenheit.

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The soil of the Recôncavo, especially that of the sugar-Recôncavo, is extraordinarily fertile. It is a heavy black soil, known as massapé, approximately 6 inches to 2 feet thick, covering a clayey subsoil, known locally as taguá. Here and there are outcroppings of sand and mixtures of sand with clay.

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1. Atlas pluviometrico do Brasil (Rio de Janeiro, 1914-1938).

2: Hutchinson E-4,5 (1950-1951) 1957 SO11 Bahia Brazilians SO11

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Sugar cane has proved to grow especially well with the combination of warmth, rain, and massapê, and the soil has been producing the same crop for almost four hundred years. The area of massapê is sharply defined, for at its farthest edges the land rises to the regions of sandy scrub forest and desert which characterize what has been called the "other northeast"[2] or the sertão.

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The surface of the sugar-Recôncavo is characterized by rolling fields cut by shallow valleys. Although the massapê is not subject to erosion, the other soils, where exposed, are. During the rainy winter season much damage is done, especially to the roads, which for the most part follow the non-massapê soils. Underneath the soil of the sugar-Recôncavo there are recently discovered oil deposits. The quantity of oil has not yet been determined, for the explorations are still going on. However, the national government has already begun to exploit the oil, which is close to the surface. Under Brazilian law, subsoil resources belong to the national government and not to the owner of the lands. As a result there has been a small-scale invasion of petroleum workers on the privately owned lands of the sugar-cane planters. To date, this has not interrupted the agricultural routine to any great extent, at least not in Vila Recôncavo. In Conselho (see map of community), where the drilling was first started, the government bought the land from the individuals and the sugar mill corporation owning it and has turned once green fields of sugar cane into bare fields, spotted here and there with oil wells. The former agriculturalists have had to leave the area or become laborers in the oil camps and refinery.

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The Recôncavo is one of the most densely populated regions in Brazil. It is an area of 6,500 square kilometers, with a population of 683,000 in 1940, distributed in 14 counties including the capital. It has an average density of 106 inhabitants per square kilometer,[3] in comparison with the average density of the state of Bahia, which is 7 persons per square kilometer, and with the national average of 5 persons per square kilometer.[4] It must be remembered that these figures include

[TEXT CONTINUED ON PAGE 13]

2. Preston James, Latin America (New York, 1942), p. 411.
3. Aroldo de Azevedo, "Recôncavo da Bahia," Revista da Universidade de São Paulo, I (1950), 14.
4. T. Lynn Smith, Brazil (Baton Rouge, 1947), p. 131.

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[291] The others, barefoot, wearing shorts and large-brimmed straw hats, are the permanent dwellers of the islands: fishermen, stevedores, and storekeepers.

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[226] When the islands are left behind, the scene begins to change. The color of the water changes from a clear, deep blue to a muddy gray. Groups of canoes are seen, their occupants busy with their fish nets, for this shallow part of the bay is a good fishing ground. Once again the mainland is close, rolling hills covered with a thousand shades of green--sugar cane, the crop which nearly four hundred years ago replaced the virgin forests. The deltalike shores of this part of the bay are covered with mangue, muddy areas with low-growing trees which at high tide are standing in the water. On a hill at the water's edge is the town of Vila Recôncavo, a town of 1,462 persons. The first thing one sees is the huge Franciscan convent[5] with its two tall towers and its royal palms. Approaching the long dock which juts out into the water, one can see almost the whole town, which is built on three hills and in the valleys between them.

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[361] The arrival of the boat from Salvador every other day is an event in an otherwise dull day. Nearly all the men of the town go down to the dock to meet the boat, to see who is traveling, to see what is arriving for someone in the town, to receive messages or parcels, to greet friends, and to gossip. The postmistress is there, and with her the man whose duty it is to carry the mail sack, but who has a helper to do it for him. After a few minutes the boat continues its journey, and the townsfolk walk back along the dock, breaking up into small groups on reaching the main square and then each going his own way.

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344 On the square at the end of the dock, at the foot of the main street which leads up the middle hill and out into the

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[128] 5. It should be explained that "convent" in this case is a direct translation from Portuguese. In Portuguese, convent does not have the connotation of being a religious establishment only for women. The word convento is applied to the Franciscans' establishment because the Franciscans are not monks; if they were, their establishment would be called a mosteiro (monastery). In English, Franciscans are known as "friars," and their houses are called "friaries." However, throughout this monograph the direct translation, convent, is used.

4: Pierson Z-4, 5 (1935-1937) 1967
SOll Bahia Brazilians SOll

[City of Salvador]

In the lower city lies, of course, the port, with its customs, warehouses, shipping and consular offices, banks, the marine arsenal, the post office, the Association of Commerce, the principal public market, jewelry shops, hardware and cigar stores, and most of the men's shops of the city. Up on the promontory and extending out toward the suburbs are the public buildings and most of the churches, the convents and monasteries, hotels and movie theaters, the public library, museums, professional schools, primary and secondary institutions, hospitals, women's shops, photographic galleries, furniture and dry-goods stores, confectionary stalls, the "five and tens," physicians' and dentists' offices, clubs, the principal parks and *praças*, and the residential areas of the city.

Bahia the city is the economic and political capital of Bahia the state, whose area of 342,000 square miles makes it considerably larger than Texas. The region is composed in large part of a vast plain of gneiss formation which rises abruptly from the comparatively narrow coastal belt to heights varying from 600 to 1,200 feet in the interior. Upon this plateau and running north and south across the central portion of the state lie a series of low mountains composed principally of sedimentary rock, sandstone, or conglomerates and containing such minerals as iron, manganese, copper, lead, gold, and diamonds (including the black *carbonado* so essential for tool-cutting). This mountain barrier acts as a valuable condenser, gathering moisture for a land which otherwise might be virtually desert. In the extreme western part of the state the plateau is composed of sandstone overlying limestone, and thus it provides a natural sponge which assures perennial rivers in a region where light rains and near drought alternate in six-month periods.

4: Pierson Z-4, 5 (1935-1937) 1967
SOll Bahia Brazilians SOll

[City of Salvador]

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struggle of native labor versus foreign capital and thus tend [466] to unify rather than to divide the local group. Religious [798] competition has not become severe enough to intensify self-consciousness on the part of rival adherents and thus evoke [621] serious animosities. As far as national affairs are concerned, intense local loyalties had not, at least at the time this study was made, been seriously exacerbated by onerous control from without. A minimum of racial conflict will be evident throughout this account.

THE *ricos* OF THE RIDGES AND THE *pobres* OF THE VALLEYS

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One of the things Darwin noted, when he visited Bahia in 1832, was that the city rested upon "a level plain of about three hundred feet in elevation, which in all parts has been worn into flat-bottomed valleys."[1] Today the scene is still much as Darwin saw it. Continuing erosion has merely emphasized the general characteristics of the landscape, transforming the once level plain somewhat more decidedly into alternating ridges, relatively steep declivities, and comparatively narrow valleys.

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This physiography of the country has not been without significance in the cultural life of Bahia; for, in general, the distribution of the population by classes, and even to some extent by ethnic divisions, follows quite closely the lay of the land. Along the ridges, which wind with the changing [363] terrain, ordinarily run the principal streets, bearing the chief [133] lines of transportation, whether by streetcar, bus, or automobile. So far as accessibility to the center and other prin- [494] cipal parts of the city is concerned, here are the more convenient residential locations. The elevation of the ridges,

[1] Charles Darwin, *The Voyage of the Beagle* ("Harvard Classics," Vol. XXIX [New York, 1909]), p. 521.